

## REMARKS

The Office Action dated December 10, 2008, has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1, 3-4, 6-9, and 11-21 are currently pending in the application, of which claim 1 is the only independent claim. Claims 1, 4, 6, and 17 have been amended to more particularly point out and distinctly claim the invention. No new matter has been added. Claims 2, 5, 10, and 22 have been cancelled without prejudice or disclaimer. Claims 1, 3-4, 6-9, and 11-21 are respectfully submitted for consideration.

Although the Office Action made the restriction of claim 22 final, claim 22 has been cancelled, and consequently the restriction of claim 22 is effectively moot. Thus, no further response to the restriction of claim 22 has been presented or is necessary.

Claims 5-9 and 12-18 were rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. This rejection was based on formulas reciting subscripts that allegedly lacked antecedent basis. This rejection is moot in view of the amendment of claim 1, as claim 1 now provides adequate and clear antecedent basis for the subscripts to which it is believed that the Office Action referred. Withdrawal of the rejection is respectfully requested.

Additionally, claim 17 was rejected because it recited “preferably,” but this recitation has been deleted. Accordingly, it is respectfully requested that the rejection of claim 17 be withdrawn.

Applicants note that claims 11-20 were not rejected based on alleged prior art. Accordingly, it is respectfully requested that, at a minimum, claims 11-20 be identified as reciting allowable subject matter – since the formal rejections are clearly overcome. It is further respectfully submitted that claims 1, 3-4, 6-9, and 21 also recite subject matter that is patentably distinguishable over the cited art, as will be discussed at greater length below.

Claims 1-4 were rejected under 35 U.S.C. §102(b) as allegedly anticipated by “A Class of Chemical Pinning Centers Including Two Elements Foreign to HTS” of Weinstein, *et al.* (“Weinstein”). Applicants respectfully submit that the pending claims recite subject matter that is neither disclosed nor suggested by Weinstein.

Claim 1, upon which claims 3-4, 6-9, and 11-21 depend, is directed to a method of manufacturing a doped X-Ba-Cu-O material. The method includes (a) mixing an X-Ba-Cu-L-O material with an X-Ba-Cu-O material. The method also includes (b) crystallising the mixture. Each X is independently selected from a rare earth (Group IIIB) element, yttrium, a combination of rare earth elements, or a combination of yttrium and a rare earth element; and each L is one or more elements selected from U, Nb, Ta, Mo, W, Zr, Hf, Ag, Pt, Ru and Sn. The X-Ba-Cu-L-O material comprise material of general formula:

$X_wBa_xCu_yL_tO_z$ . In that formula, each X and L is as defined hereinabove and w is 1, 2 or 3; x is 2 to 4; y is 0.1 to 1; t is 0.5 to 1; and z is 4 to 15.

Applicants respectfully submit that Weinstein fails to disclose or suggest all of the elements of any of the presently pending claims.

The Office Action has referred to the alleged deficiencies identified during the PCT procedure, namely those identified in the written opinion in relation to the Weinstein document. In the written opinion, Weinstein, at page 440, left hand column, was relied upon. Weinstein refers to the formation of deposits in an X-Ba-Cu-O material and focuses on using U and Pt as dopants. Though the use of an X-Ba-L-O dopant is mentioned on page 440, it is admitted by Weinstein that this approach failed.

Also, as the Office Action has rightly noted, Weinstein did not disclose or lead one of ordinary skill in the art towards the inclusion of Copper in the dopant material and there is no suggestion to use an X-Ba-Cu-L-O material. Claim 1, as presently pending, is therefore novel over the disclosure of Weinstein – *i.e.* Weinstein does not disclose or suggest all of the elements of the claim.

Applicants have found that the use of an X-Ba-Cu-L-O material of the type defined by amended claim 1 provides surprising benefits in the control of pinning centres and thus of the properties of the doped X-Ba-Cu-O material. Accordingly, these features of claim 1 are also non-obvious, and can serve to patentably distinguish over the cited art.

Certain embodiments of the present invention can advantageously provide a superconductor having improved properties. With the method of claim 1, the two

materials (X-Ba-Cu-O and X-Ba-Cu-L-O) can be mixed and crystallised together to optimise the dispersion and size of the X-Ba-Cu-L-O pinning phase within the X-Ba-Cu-O superconducting phase. The typical size of the pinning phase within the superconducting phase is tens of nanometres, which is at least an order of magnitude better than achieved by conventional manufacturing methods. This provides high quality pinning centres, which can allow the superconductor to carry higher currents and maintain higher trapped fields at a given current. Thus, certain embodiments of the present invention provide critical and unobvious advantages over the cited art.

The disclosure of Weinstein does not teach, disclose, suggest, or otherwise hint at the mixing together and crystallisation of compounds X-Ba-Cu-O and X-Ba-Cu-L-O. The method and resulting product of the pending claims, and in particular claim 1, are therefore inventive and non-obvious over the methods and products disclosed in Weinstein. Therefore, the rejection of claim 1 should be withdrawn, and withdrawal of the rejection of claim 1 is respectfully requested.

Claims 3-4 depend from, and further limit, claim 1. Thus, each of claims 3-4 recite subject matter that is neither disclosed nor suggested by Weinstein. Claim 2 has been cancelled without prejudice or disclaimer, as noted above. It is, therefore, respectfully requested that the rejection of claims 2-4 be withdrawn.

Claims 1-9 and 21 were rejected under 35 U.S.C. §102(b) as allegedly anticipated by “Preparation and Properties of  $\text{Ba}_2\text{Y}\text{Zr}\text{O}_6$ - $\text{YBa}_2\text{Cu}_3\text{O}_7$  Composites” of Paulose, *et al.*

(“Paulose”). Applicants respectfully submit that the pending claims recite subject matter that is neither disclosed nor suggested by Paulose.

As discussed above, claim 1, upon which claims 3-4, 6-9, and 11-21 depend, is directed to a method of manufacturing a doped X-Ba-Cu-O material. The method includes (a) mixing an X-Ba-Cu-L-O material with an X-Ba-Cu-O material. The method also includes (b) crystallising the mixture. Each X is independently selected from a rare earth (Group IIIB) element, yttrium, a combination of rare earth elements, or a combination of yttrium and a rare earth element; and each L is one or more elements selected from U, Nb, Ta, Mo, W, Zr, Hf, Ag, Pt, Ru and Sn. The X-Ba-Cu-L-O material comprise material of general formula:  $X_wBa_xCu_yL_tO_z$ . In that formula, each X and L is as defined hereinabove and w is 1, 2 or 3; x is 2 to 4; y is 0.1 to 1; t is 0.5 to 1; and z is 4 to 15.

Applicants respectfully submit that Paulose fails to disclose or suggest all of the elements of any of the presently pending claims.

For similar reasons to those discussed above with respect to Weinstein, it is respectfully submitted that the disclosure of Paulose cannot undermine the novelty or non-obviousness of the present invention as recited in, for example, claim 1.

Paulose discusses the preparation of a  $(Ba_2YZrO_6\text{---}YBa_2Cu_3O_7)$  composite, which is also referred to as a composite of YBCO and BYZO. This comprises the use of a compound (YBCO) which can be considered to fall within the definition of an X-Ba-Cu-O material. However, it does not utilise an X-Ba-Cu-L-O material in combination with

X-Ba-Cu-O or make any teaching in that respect. Instead it uses a Ba<sub>2</sub>YZrO<sub>6</sub> (BYZO) material.

There may have been numerous papers on adding elements to rare-earth barium copper oxides to improve pinning. One thing that distinguishes the present claims and sets them apart from Paulose and other disclosures similar to Paulose is that the invention recited in claim 1 employs a specific X-Ba-Cu-L-O material. This specific X-Ba-Cu-L-O material can be made separately and can retain its identity as it disperses in the X-Ba-Cu-O material. Additionally, as noted above, surprising, critical, and unobvious advantages are the result of the invention, thereby demonstrating that it is not only novel but also non-obvious with respect to the cited art. It is, therefore, respectfully requested that the rejection of claim 1 be withdrawn.

Claims 3-4, 6-9, and 21 depend from, and further limit, claim 1. Thus, each of claims 3-4, 6-9, and 21 recite subject matter that is neither disclosed nor suggested by Paulose. Claims 2 and 5 have been cancelled without prejudice or disclaimer, as noted above. It is, therefore, respectfully requested that the rejection of claims 2-9 and 21 be withdrawn.

For the reasons set forth above, it is respectfully submitted that each of claims 1, 3-4, 6-9, and 11-21 recites subject matter that is neither disclosed nor suggested in the cited art. It is, therefore, respectfully requested that all of claims 1, 3-4, 6-9, and 11-21 be allowed, and that this application be passed to issuance.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, Applicants' undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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Enclosures: Petition for Extension of Time  
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